Effect of 12 Week Psychological Intervention on Selected Psychological, Physiological, Attributes and Performance of National Level Archers

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Chapter I

INTRODUCTION

Sports include a wide area which aims to develop and maintain physical abilities and skills of an individual. It includes all forms of competitive physical activities. Sports provideenjoyment to the participants through participation in activities and entertainment to the spectators.

Coaches and athletes are well aware about the importance of physical skills. They know that regular and harder practice of physical skills is inevitable for greater performance in sports. Most of them neglect the psychological aspects. Like physical skills, psychological aspects such as maintaining concentration, focusing attention, arousal regulation, boosting confidence and enhancing motivation also need to be regularly and systematically practiced. As a physical education teacher or coach, we have seen that athletes curse their poor performance to such factors like lack of motivation, poor concentration, lack of confidence and losing under pressure. Yet the coaches and players cannot find the real problem of poor performance. They try to correct the performance by spending much more time in physical skill practice. In any sport, an athlete's success and failure results from the combination of both physical and psychological abilities. Studies prove that performance in sports is at least 50% psychological; in the case of target sports it becomes 70% to 80%. Fluctuation in daily and day to day performance is the result of psychological factors. These fluctuations in mind can be managed by developing psychological skills and also by practicing strategies to manage anxiety, stress, negative thoughts and emotions.

1.1 Sports Psychology

Sports psychology is a branch of science which deals with the behaviour of athletes in both practicing and competition times. Main focus of sport and exercise psychology is enhancing the performance of the individuals. It also put light on how to improve the psychological qualities and how to use those enhanced qualities in various situations. According to Weinberg& Could, the development of sport and exercise psychology passes through 6 eras. The period began in 1895 by Norman Triplett and now the period of 6, the field becomes a dynamic and interesting one.

According to Cherry K (2018), sports psychology is the study of how the mind affects sports performance, sport participation and individual life of sportsmen. It mainly focuses on

improving the performance of the sports persons and also to enhance the psychological abilities. Sports psychologists can help the athletes to overcome the psychological distractions and also the pressure comes from the competitive situations. Sports psychology is also useful for faster recovery from the injuries.

1.2 Imagery

According to Suinn (1993), imagery is "the ability of the mind to create or recreate sensory experiences that are similar to the real environment." According to Morris (1997), "imagery is an individual's capability of forming vivid, controllable images and retaining them for sufficient time to effect the desired imagery rehearsal". Producing stimulation in the neurons just similar to actual experiences is known as imagery. In this stimulation all the senses and experiences of emotions are included for better effectiveness. Through imagery, individuals can recreate previous feelings or pictures.

Visualization or mental rehearsal is the other names of imagery. "Top athletes use imagery in their daily training routine to build their strengths and to eliminate their weaknesses". Imagery helps the athletes to control their emotions during the competitions and also to improve self-confidence, attention and mental toughness. Elite athletes consider imagery as a tool for developing their techniques. They use imagery to assist in setting the daily goals, and in addition to staying motivated during tough training sessions. During the injury period or the other situations which lead the athlete to remain inactive or training is not possible, imagery helps them to maintain the abilities through physiological process. Imagery acts as a tool for enhancing the healing process of the injured person.

When combining imagery with the actual practice, the performance will be improved more than practicing alone (Ramachandran A, 2005). Imagery impacts in every aspect like psychological, emotional, physical, physiological, tactical and technical. There are four factors which affect the quality of mental imagery; - control over the images, imagery perspective, usage of multiple senses and speed of imagination.

- **Control over the images**: It means while using imagery as a mental tool, the player must have an idea about what he wants to imagine. If mistakes occur in the imagery session, he shouldn't avoid the mistakes, must re- imagine the actions and correct the actions and continue.

- **Imagery perspective**: Imagery perspective means, the position in which the player sees his own body and movements. Internal perspective involves seeing one's own actions from inside the body and analysing the actions whereas external perspectives concern seeing body and movements from outside.
- **Multiple senses**: While practicing the imagery one must include all the senses which are involved in actual situations. The senses include sights, smell, sounds, thoughts of mind and emotions, etc.
- **Speed**: Slow motion of movements is more effective than the speed motions. Slow images are better to control.

1.3. Factors Influencing the Effectiveness of Imagery

The effectiveness of imagery intervention on performance may be affected by a number of factors. The result of the study done by Baschker, Bakker and Rietbery (2000) Calmels and Fournier (2001), found that the imagination speed of a skill may be different from the speed at which the same is physically executed. And also they found that the skill which is more technically difficult will take more time for imaging. Reducing anxiety of an athlete in competitive situations through imagery intervention may depend on the personal characteristics of the individual. The content of imagery would affect the efficacy of imagery intervention. Task relevant content must be recommended for better effectiveness. Positive imagination of the skill would enhance the performance whereas negative imagery content included in training may negatively influence the performance. Beginners will get more results than the elite players as a result of imagery intervention.

While looking at the best usefulness of imagery, the sessions should not be in longer duration. The study conducted by Etnier and Landers (1996), found that the participants who practiced for one to three minutes were the group which got more improvement than the group which practiced for five to seven minutes. In the case of motor tasks, it will be better to practice fifteen to twenty-five minute sessions. Less than six trials were required to achieve great effects on cognitive tasks, but in the case of motor or strength tasks, greater number of repetitions or duration were required. Hinshaw (1991) found that 12 fifteen to twenty-five trials were the best number of repetitions for enhancing the performance.

1.4 Self-Regulation

We use the term "self-regulation in sport" to refer to self-initiated thoughts, feelings, and actions that athletes use to attain various goals. Acquiring expertise in sports requires high levels of self-regulation and self-motivation. Elite athletes and coaches often mention self-regulation as one of the most important factors for their success. Similarly, researchers and practitioners have focused their attention on gaining a better understanding of athletes' self-regulatory functioning in sport, exercise, and physical education contexts.

Self-regulation comprises of four core aspects: *standard, monitoring, strength* and *motivation*. Regulation means a change to bring into line with some standard, which is not possible without keeping track or monitoring current states, and so the first two aspects are inextricably linked. For example, if a tennis player is to reduce her angry outbursts on the court in line with the umpire's standards, she must monitor her thoughts, feelings, and behaviours to curb displays of frustration following unfavourable line calls. This "curbing" is difficult and, much like any effortful task requires energy. Therefore, self-regulatory strength will determine whether the tennis player is capable of avoiding displays of frustration. Motivation to change is also necessary; in this example, if the outbursts are leading to point penalties, this may increase the tennis player's motivation to change her responses. The core aspect of self-regulation that has generated most research is the notion that self-regulation requires energy, and as such can be depleted.

Zimmerman (2000) developed a social cognitive model of self-regulation that includes motivational beliefs and cognitive processes in three cyclically interrelated phases:

1. Forethought,
2. Performance, and
3. Self-Reflection.

Forethought Phase

The forethought phase precedes athletes' engagement in a task and includes task analysis processes (e.g., goal setting and strategic planning) and motivational beliefs (e.g., self-efficacy, task value, goal orientation) that facilitate athletes' preparation and motivation to engage in self-regulated learning. Elite athletes and coaches often comment on the importance of these forethought processes. For example, former top tennis player Chris Evert stated "You've got to take the initiative and play your game. In a decisive set, confidence is the difference",

whereas football coach Homer Rice commented on the importance of self-motivation in learning and performance: “You can motivate by fear, and you can motivate by reward. But both those methods are only temporary. The only lasting thing is self-motivation”.

Performance Phase

In the performance phase, athletes are actively involved in learning a task, observing their performance, and using strategies to facilitate the attainment of their goals. During this phase, an athlete uses strategies such as imagery, help seeking, self-instruction, and self-observation techniques such as self-recording. “When you record your training, it crosses the line between being casual or serious about the sport,” says Roisin McGettigan, an Irish track-and-field athlete. She also stated: “I was able to track my progress, learn what worked and what didn’t. I could figure out why I was tired and see if I over- or under- estimated my training.” It is important to note that the effectiveness of these strategies depends on how well an athlete engages in self-observation.

Self-Reflection Phase

The self-reflection phase involves processes that follow learning and/or performance efforts, for example self-judgment and self-reactions. Self-judgment refers to self-evaluation and attributions, while self-reactions are self-satisfaction/ affect or adaptive inferences (e.g., athletes engage in goal adjustment based on outcomes) and defensive inferences (e.g., athletes engage in procrastination or task avoidance). It is in this phase that athletes judge their performance and assign causes to their outcomes based on prior self-monitored data.

Self-regulated learning in sports can be summed up with a quote from Brittany Bowe, an American Olympic speed skater, who stated: “You have to be a student of the game to be successful, and it’s promising when you can say that with a world-record performance, I still have things to improve on!” Indeed, expert athletes create self-oriented feedback loops to monitor the effectiveness of strategies and to adapt their functioning to maintain and improve performance outcomes.

1.5 Archery

Historically, archery was used for hunting and combat. The bow and arrow were used as the weapon. Ancient Olympics they include archery as a competitive game and they used tethered doves as the targets. In 1900 modern Olympic Games, the archery was included as official event. Competitive archery involves shooting arrows to the target from a predetermined

distance. Competitive archery is also known as target archery. Recurve is the event which is included in the Olympic Games. Compound and Indian round events are also there in the archery game. The differences between these events are based on their equipment like bows and arrows. Indian round is only approved in India, because it is purely follows the traditional equipment. E.g.: they use wooden bows and arrows.

Like any other target sports, performance of archery also depends more on psychological factors. Researchers found that archery performance depends on nearly 70% of mental aspects and remaining 30 % of physical strength. The archer with great physique couldn't achieve a great score if he has poor psychological skills. But in fact excellent mental strength helps the archer to perform very well in competition and also in crucial situations.

While speaking of psychological skills, one can develop those skills with proper support and training. The most used psychological intervention for improving archery performance is imagery. Kim, the psychologist of Korean archery team, said more in this aspect. She explained that mental strength and confidence are the deciding factor for better performance in archers. The archers use imagery as a hidden tool for their elite performance.

The art of shooting innately deals with manmade problems that need solving. It is a dire and disastrous assumption to think that shooting is purely physical. Every archer is aware of the dreaded target panic phenomenon. The actual problem is that many of them believe that this phenomenon is physical in origin, while the symptoms are affected in physical ways (punching the trigger, freezing, nervousness, etc). The real issue is 100% psychological. Theresa V (2016), quoted that the performance of shooting is connected with an individual's perceived level of competence/confidence in their event, whether one's motivation for success comes from fear of failure as opposed to personal performance goals, and whether or not external and internal elements are also the motivating factors. But in competitive situations, the archers are more aware about the surrounding environment and the spectators, rather than their target. It will affect their performance. They performed well in their practice sessions, but they can't achieve well in competitions. It is purely because of their unfavourable tolerance of negative thoughts in their mind. To overcome this phenomenon, one must realize their mind's strengths and weaknesses. Instead of that the archer can control the negative emotions, which affects their performances; by using certain psychological interventions.

In 1996 onwards Italian elite archers used psychological interventions to control the emotions of the archers. Arirang news channel in South Korea reported the news (6 July 2016)

about their preparation for the Rio Olympics. They reported that their archers included the mental imagery in their training 17 schedule. They achieved a total 19 gold medals in archery from 1984 Olympiad to 2012. The report shows that South Korea's female archers equipped their presence in Olympic archery events by winning gold medals in individual and team events. Their archers take part in noise training as a part of mental training.

In the case of Indian archery, archers lack mental training. While looking at the performance of DeepikaKumari, former world no.1, in Rio Olympics pre- quarter final elimination, she loses against her opponents without taking only one set. By analysing the whole match, Deepika was under pressure because of her opponent's calmly striking. While continuing the competition, she proved her undoing. It was because of poor controlling of the emotions. It was the condition of our elite archer.

Studies conducted by Ariratnam, et al. (2016), Bebetos E (2015) on psychological profiling of archers recommended that, incorporation of psychological skill training to the daily training schedule may greatly affect the performance of archers. If our archers are well nourished with mental training, we can achieve good heights in archery. This study mainly focuses to reveal the effect of mental imagery on the performance of archers and also with the psychological abilities. It will help the coaches and archers to know the importance of mental training. Here, the study examines the effect of imagery training on the performance of archers and how these training alter their psychological characteristics. And also helps the coaches to make appropriate imagery sessions for the archers. The study also checks the effect 18 on selected psychological variables which are influencing the archer's performance.

Statement of the Problem

The primary purpose of the study is to find out the effects of 12 week psychological interventions on selected psycho-physiological attributes and performance of National LevelIndian archers.

Objectives of the Study

1. To find out the effects of 12-weekpsychological skill intervention on selected psychological attributes of National LevelIndian archers.
2. To find out the effects of 12-week psychological skill intervention on physiological attributes ofNational LevelIndian archers.
3. To find the effect of 12-weekpsychological skill intervention on performance of National LevelIndian archers.

Delimitations

1. The study will be delimited to thirty (N=30) National level Indian archers fromNational Centres of Excellence (NCOE), Sport Authority of India at LNIPE, NERC,Guwahati.
2. The samples selected for the study will be male and female with their age ranging between 16-21 years.
3. Further, the samples will be divided into three groups, viz, two experimental and one active control group with 10 samples each.
4. Intervention/training period will be delimited to 12-week period of time.
5. Training will be given thrice a week on every alternativeday (i.e., Monday, Wednesday & Friday).
6. The following variables will be delimited for the proposed study under the psycho-physiological and performance parameters:
    - Anxiety
    - Sport Imagery
    - Heart Rate
    - Cortosils
    - Performance

Limitations

The following are the limitations considered for the study:

1. Any response biasness towards filling the questionnaire may be considered as a limitation of the study.
2. Individual's participation and perception towards psychological skill intervention may be considered as the limitation of the study.

3. The unequal proportion in the number of males and females selected for the study may be another limitation of the study.
4. The total number of years participating in the sports may affect the result in terms of experience of the players, hence may be another limitation.
5. Environmental conditions such as wind, humidity, temperature, etc. during archery performance may affect the result of the proposed study and may be considered as limitation.

Hypotheses

The following hypotheses are formed:

1. There will be significant improvement in shooting performance following twelve weeks of psychological interventions.
2. There will be significant reduction in anxiety level following twelve weeks of psychological interventions.
3. There will not be significant effectonheart rate following twelve weeks of psychological interventions.
4. There will be significant reduction inExcess Post-Exercise Oxygen Consumption (EPOC) as a result of12 week psychological interventions.
5. There will be significant improvement in imagery ability following twelve weeks of psychological intervention,

Significance of the Study

1. The study may help to determine the effect of psychological interventions on psycho-physiological intervention and performance of the archers.
2. This study will provide detailed information about psycho-physiological and performance variables associated with imagery and self-regulation techniques over the course of twelve weeks.
3. The study will be beneficial for coaches and physical education teachers for making mental preparation of teams for competition.

4. The study will be helpful for coaches to prepare psychological intervention programs for the players.
5. The study will provide knowledge in the area of psychology with special significance on the mental rehearsal and self-regulation.
6. The findings of the study will help coaches and physical educators to train their sports persons based on new concepts in improving their performance.

Definition and Explanation of the Terms

Intervention

In sport psychology, the intervention process involves "actions initiated by someone other than the athlete that focused on psychological skills [and strategies] in an attempt to improve the athlete's performance during competition" (Greenspan &Feltz, 1989, p. 221).

Imagery

According to Spittle and Watt "Imagery in the context of sports, may be considered as a creation of or recreation of an experiences generated from memorial information involving quasi sensorial, quasi perceptual and quasi affective characteristics, that is under the volitional control of the imager and which may occur in the absence of the real stimulus anti incidents normally associated with the actual experiences". (Spittle and Watt, 2005).

Self-regulation

We use the term "self- regulation in sport" to refer to self-initiated thoughts, feelings, and actions that athletes use to attain various goals (Zimmerman &Kitsantas, 2005).

Anxiety

Sports anxiety is a complex, multi-dimensional construct, which is defined as a negative emotional state associated with activation or arousal of the body. Even though anxiety is a negative emotional state, its effect on athletic performance can either be positive, negative or for some, have no impact depending on factors related to the athlete and the task.Sports anxiety occurs when individuals view competitive situations as threatening and respond to these situations with apprehension and tension (Martens et al 1990).

Trait anxiety

Competitive trait anxiety (CTA) is a behavioural predisposition to perceive competitive situations as a threat and then respond with state anxiety levels that are disproportionate to the levels of objective threat (Martens, Vealey, & Burton, 1990).

State anxiety

State anxiety can be defined as a transitory emotional state consisting of feelings of apprehension, nervousness, and physiological sequelae such as an increased heart rate or respiration (Spielberger 1979).

Chapter II

REVIEW OF RELATED LITERATURE

This chapter presents the various literatures that support the theoretical basis of the present study. Review of literature helps the researcher to equip himself with the knowledge that is required for studying and interpreting the outcomes of the study. This chapter helps the researcher to get the ideas on developing the concept, procedures, variables and appropriate tools for testing the variables and basic recommendations for constructing the intervention programme. In this chapter, a number of research articles on how imagery intervention affects the sports performance and psychological variables are reviewed, synthesized and summarized.

Hasmar and Riyadi (2019) examined the effectiveness of imagery training on thirty-meter performance of archers in Jambi University. A total of fourteen intermediate level archers with the age group of fifteen to eighteen were selected as the subject and equally divided into two. Pre-post-test design was used in this study. Duration of the training programme was one month. 25 The result of the study indicated that, experimental group improved shooting performance as a result of imagery training.

Jaafa Z and Kassim (2016) interrogate the effect of imagery training on anxiety level and performance of archers. Total sixty subjects were selected and divided into two as experimental and control. Duration of the training programme was six weeks. Training was given thrice in a week. The study revealed that imagery intervention was found to be the best method to reduce competitive anxiety. Confidence and shooting performance was improved as a result of imagery training.

Dhillon N et al (2016) examined the effect of psycho-physiotherapeutic approach in enhancing performance in elite archers. Thirty elite archers were selected. Psychological skill training was used as the independent variable. Duration of the training programme was six weeks. The result of the study indicated that there was a significant improvement in shooting performance and self-confidence of archers. Anxiety was reduced as a result of PST training.

Bebetsos E (2015) conducted a study to examine the relationship between ages, gender exposure in competition related to psychological skills among elite archers. Seventy subjects were selected. Result shows that, significant difference occurs between age groups on freedom of worries and peaking under pressure. There is no difference between genders. The

study also shows that older and experienced archers have greater emotional control than the novice archers.

Tursi D. and Napolitano S. (2014) evaluate the effectiveness of motor imagery intervention in practice of archers. Twenty archers were selected as subjects. Duration of the training programme was six months. Video modelling along with motor imagery was used for perfection of techniques. The result of the study proved that motor imagery can enhance the perfection of skills.

Theodosiou and Papaioannou (2006) found that task orientation was a positive predictor of self-monitoring and evaluation, whereas ego orientation was unrelated to self-monitoring, in physical education students. Elite young athletes characterized by a high task/high ego profile, used imagery more often than those characterized by a low task/moderate ego and moderate task/low ego profile (Harwood, Cumming, & Hall, 2003); in a second sample of elite athletes, those in the high task/moderate ego group reported more frequent use of goal setting, self-talk, and imagery compared to the low task/high ego, and moderate task/low ego groups (Harwood, Cumming, & Fletcher, 2004). Finally, in an experiment involving undergraduate student athletes (Gamo-Overway, 2008), participants in the task-involving condition (i.e., focus on improving their reaction time), used collectively more self-regulation strategies (i.e., planning, monitoring, goal setting, task strategies, and self-evaluation) while performing a novel computer reaction-time task, compared to those in the ego-involving condition (i.e., focus on outperforming others). These results suggest that task orientation is the critical goal in influencing the use of self-regulatory processes in athletes, but a high ego goal may have complementary benefits.

Van de Pol and Kavussanu (2011) found that task orientation was positively related to goal setting and self-talk in both training and competition and attentional control in competition; ego orientation was unrelated to these strategies in either context. Task orientation was also positively associated with effort and perceived improvement in training as well as with perceived performance in competition. Finally, an interaction effect emerged, whereby ego orientation was linked to effort in competition, when athletes had low or average levels of task orientation. These findings suggest that athletes, who tend to evaluate success using self-referenced criteria, are more likely to use self-regulation strategies not only when they practice but also when they compete. These athletes are also more likely to try hard in both contexts. However, when athletes' task orientation is low or average, ego orientation may be beneficial for effort in the competition context.

Research comparing expert, novice and non-expert athletes also provides evidence for how coaches can structure the learning environment to foster self-regulation. Cleary and Zimmerman (2001) found that expert basketball players displayed higher levels of self-efficacy, set more specific goals, used more process-oriented strategies, and attributed failure to strategy more so than did non-expert and novice athletes. Similar findings were revealed in a study of volleyball players (Kitsantas& Zimmerman, 2002). It may be that experts display higher levels of performance because they engage in more effective self-regulatory processes than non-experts and novices. Similarly, Walsh (2012) stressed that from a purely operational perspective, as athletes' skill level improves, the feedback and instruction should be pared down allowing them to master the exercise using more self-regulatory strategies.

Smith et al. (2010) asked regularly training athletes at the beginning of their season to select a personal sports goal to work toward and to indicate whether the goal was self-generated, whether they had a strategy to achieve it, the extent to which their coach supported their goals (i.e., was autonomy supportive versus controlling). Participants were retested at the mid-point and the end of their season. Athletes' perceptions of their coaches' support for their autonomy and participation in training decisions were positively associated with autonomous goal motives, whereas athletes, who perceived their coaches as controlling, also adopted controlled goal motives. The findings of this study suggest that coaches should avoid the use of controlling behavior such as reprimanding athletes for performing below the coach's expectations, as this could negatively affect the athletes' motivation. By nurturing the motivation of an athlete (e.g., by allowing some choice about the training, giving rationale for practice tasks, and giving clear, noncritical feedback) the coach can provide an environment that may have a favorable influence on athletes' motivation and performance

Afsanepurak S. A. and Baharam A. (2012) investigated the effect of varying combinations of self-talk and mental imagery on motor performances. Seventy-five adolescents were selected as the sample and equally divided into five groups. Group 1- negative imagery and positive self-talk, group 2-positive imagery and negative self-talk, group 3-positive imagery and positive self-talk, group 4- negative imagery and negative self-talk, group 5- control group. The research reveals that positive imagery and positive self-talk groups show greater performance than the other four groups. The study also reveals that negative imagery and positive self-talk groups have decreased performance.

Radhakrishnan (2008) undertook a study to find out the effect of mental imagery training programmes on certain psychological variables and skill performance of volleyball players. Psychological variables selected for the study were anxiety, self-confidence and

attention. Performance variables selected were serve, pass, attack and block. A total of thirty subjects were selected and equally divided into experimental group and control group. Duration of the intervention was twelve weeks. Findings of the study were, imagery intervention can reduce anxiety levels and also to impress confidence and attention. It was also revealed that intervention can enhance the performance variables.

Lori (1989) conducted a study to find out the effect of mental imagery on free throw shooting performance. Hundred and twenty subjects were selected and equally divided into four groups. Group 1- mental practice group, group 2 physical practice group, group 3- combination of mental and physical practice, group 4- control group (no practice). Duration of each session held for twenty minutes. Results proved that the combination group (group-3) improved performance higher than the mental imagery group (1). Control group shows no improvement in performance.

Marshall and Gibson (2017) examined the effectiveness of imagery intervention on self-confidence, anxiety and aerobatic gymnastic performance. Nineteen gymnasts were selected as the subjects for the study. Eleven were assigned to the experimental group and eight were assigned to the control group. Duration of the training programme was four weeks with fifteen minutes per session. Result of the study reveals that imagery intervention can increase self-confidence. There were no differences in anxiety level and aerobatic performance. They suggested that, with longer duration of imagery training can influence the anxiety level and aerobic performance.

Yahya M F, et al., (2016) interrogate the effect of practice in mind intervention on anxiety level and twenty-two meter kicking performance of Rugby players. A total of forty-eight selected as the participants. Participants were equally divided into two groups; experimental group and control group. The study showed that the PIM group shows improvement in kicking performance and self-confidence. They also achieve higher anxiety level tolerance.

Parnabas et al (2014) conducted a study to find out the relationship between imagery and sports performance. Two hundred and twenty-two subjects were selected. Results showed that imagery and sports performance have positive correlation, and also revealed that practicing relaxation techniques encourages the players to not depend on drugs for reducing anxiety. Mousavi and Meshkini (2011) examined the effectiveness of mental imagery for reducing anxiety during sports performance. Fifty tennis players were selected as the subject and divided into experimental and control groups. Results of the study revealed that imagery intervention was effective to reduce anxiety and also for improving performance.

Chapter III

PROCEDURE

Selection of Subjects

For this proposed study, thirty (N=30) National level Indian archers from National Centres of Excellence (NCOE), Sport Authority of India at LNIPE, NERC, Guwahati will be selected. The samples selected for the study will be male and female with their age ranging between 16-21 years. The samples will be selected randomly distributed to two different experimental groups and one active control group. Both the experimental groups with 10 samples each will be exposed to PST such as Imagery and Self-regulation techniques respectively. Intervention/training period will be of 12 weeks thrice a week on every alternativeday.

Selection of Variables

The variables selected for the study will be as follows:

- **Independent Variables**:

1. Imagery
2. Self- regulation

- **Dependent Variables:**

1. Psychological variables: Anxiety & Sports Imagery
2. Physiological Variables:
   - ✓ **Cortosil**
   - ✓ **Heart Rate**
- **Performance of the National Level Indian Archers.**

Criterion Measures

Details of Independent variables such as the psychological skill interventions to be given to the samples for 12 weeks will be imagery and self-regulation techniques.

Mental Imagery:

Mental imagery is a fully immersive multi-sensory procedure that associates as numerous senses to create a mental image and process it without the presence of external

stimuli. In the sport situation, imagery has been designated as the state in which people imagine themselves while effecting abilities to deal with the forthcoming duty or improve performance.Imagery may be a consequence from both thoughtful and unconscious recall procedures; an individual sees an image, or experiences a movement as an image, without experiencing the real thing through a process. Imagery plays a significant role in this context, improving performance in motor tasks (Di Corrado et al., 2014, 2019).

A sequence of tasks evaluating mental imagery skills including maintenance, inspection, generation, and manipulation of different categories of images will administer

Self-Regulation

Self-regulation skills are elements of emotional intelligence that relate to how well you manage your thoughts and actions. Self-regulation requires commitment, self-reflection and practice. The process is ongoing, as you will need to monitor your thoughts and actions regularly, align with your goals and make changes where necessary. Life and work can be stressful, so it's important to practice techniques to help with self-regulation so you can thoughtfully choose how to respond during trying times. Here are some steps to develop self-regulation abilities: **Practice self-awareness, meditate, exercise, align the goals with the values, be kind to oneself, engage in positive talk, seek feedback, hold oneself accountable and educate oneself**.

Details of psychological parameters (anxiety and sports imagery) as dependent variables:

Anxiety as the psychological variable will be measured by the following:

Sports competition anxiety test (SCAT): This test developed by Martens (1977) is a self-reporting questionnaire, comprising of 15 questions on anxiety that assesses an athlete's responses to a series of statements about how they feel in a competitive situation and based on their response, the administrator of the test can determine a measure of their level of anxiety categorized as low, moderate and high. According to the manual, the internal consistency of the test is in an acceptable range as the Kuder-Richardson coefficient values obtained for the different samples are on the order of 0.90 or higher (Martens, 1977). The test-retest reliability 28 of the SCAT has been documented to range from r= 0.73-0.88 and internal consistency of r= 0.95-0.97.

Competitive state anxiety inventory-2 (CSAI-2): The Competitive State Anxiety Inventory-2 is a 27-item self-report inventory developed by Martens et al. (1990) designed to measure state anxiety in competitive situations. The CSAI-2 comprises of three subscales measuring cognitive anxiety, somatic anxiety, and self-confidence, with each subscale comprising of nine items. The CSAI-2 was constructed primarily as a research tool, and the usefulness of the inventory as a diagnostic instrument for clinical purposes has not been established. The CSAI-2 normally takes 5-7 minutes to complete and is administered within one hour of the competition. Ideally it must be administered as close to the competition as possible. When administering the CSAI-2 it is recommended that the title on the form given to subjects be the Illinois Self-Evaluation Questionnaire (or the state of your choosing). This technique may help reduce response bias to the inventory The CSAI-2 is scored by computing a separate total for each of the three subscales, with scores ranging from a low of 9 to a high of 36. No total or composite score of anxiety is computed through the inventory. Reliability analysis of CSAI-2 conducted by Fernandez et al. (2013) demonstrated that the original model of the CSAI-2 (9 items per factor) achieved good levels of internal consistency with Cronbach alpha levels exceeding .80, which is consistent with previous research (Coelho et al. 2007; Fernandez et al. 2007; Lundqvist&Hassmen, 2005; Martens et al., 1990). The Internal consistency of the different subscales of the CSAI-2, was calculated using the Cronbach alpha index (Cronbach, 1951), which yielded values between .79 and .90 (Martens, Burton, Vealey, Smith, 1990).

Sports Imagery:

The Sports Imagery Questionnaire (SIQ) is a self-report questionnaire, consisting of 30 items (Hall et al, 1998). Each item correlates to one of the five functions of imagery – Cognitive Specific, Cognitive General, Motivation Specific, Motivation General-Arousal and Motivation General-Mastery.

Each function is a separate sub-scale, therefore there are a total number of six questions representing each of the five sub-scales. The sub-scales are as follows:

1. Cognitive Specific refers to the technical mechanics and details involved with performing specific skills.
2. Cognitive General includes strategies, routines and general concepts of play.
3. Motivation Specific involves applying emotions and mental aspects to specific situations.
4. Motivation General-Arousal relates to anxiety, stress and arousal levels.
5. Motivation General-Mastery refers to one's mental toughness, focus and confidence.

The SIQ uses a 7-point Likert measurement scale to evaluate test item responses. Each question is responded to on the scale, which records the frequency in which one utilizes the five different types of imagery. (Moritz et al, 1996) A rating of '1' corresponds to rarely, whilst a rating of '7' corresponds to often.

Within each sub-scale, the responses for individual items are added together and averaged. Out of a possible 7.0, a high score demonstrates a high frequency of use. A low score indicates minimal use of the particular imagery function. It is important to note that the SIQ does not take into consideration an individual's ability to image. Thus an athlete receiving low scores on the SIQ may be due to a low imagery ability. For results that reflect both imagery content and imagery ability, the majority of studies utilize the SIQ in conjunction with the Movement Imagery Questionnaire-Revised, developed by Hall & Martin (1997). (Abma et al, 2002 ;Vadocz et al, 1997 ; Moritz et al, 1996 ;Cumming& Ste-Marie, 2001.)

The parameters of physiological aspects are cortosils and Heart rate: The physiological variables will be measured by using **Saliva lab based test for cortosil and Pulse oximeter for the Heart Rates.**

The third dependent variable is the performance of the National Level Indian Archers- This factor will be measured either by the player's performance in the competition or by conducting in-house competitions and taking a note of the scores in the game situation. During this performance assessment.

Experimental Design

Pre-test - post-test randomized group design will have used for the study. All the subjects (N=30) will be randomly divided into three groups each comprising of 10 subjects. There will be two experimental groups exposed to psychological skill training viz, mental imagery and self-regulation respectively and one active control group. Training is to be administered thrice a week (i.e., Monday, Wednesday,and Friday) for a period of 12 weeks. The diagrammatic representation is given in table 1.

Table 1

Pre-Test - Post- Test Randomized Group Design

		N=30	Time duration (T)	
			0 week	12 week
Groups (G)	Group A (Mental Imagery)	10	*s1……s10*	*s1……s10*
	Group B (Self- Regulation)	10	*s1……s10*	*s1……s10*
	Group C (Active Control Group)	10	*s1……s30*	*s1……s10*

Administration of Test and Collection of Data

The samples of the study (national level Indian Archers) will firstly be contacted by the researcher for administration and collection of data. The psychological skill interventions for experimental group will be administered atLakshmibai National Institute of Physical Education, North East Regional Centre, Guwahati. The two experimental groups will be exposed to mental imagery and Self-regulation thrice a week for a period of twelve weeks and each experimental session will be of 50 to 60 minutes' duration. Subjects will be briefed about the training programme.Consent from all the participants will be taken prior to exposing the groups to baseline data collection and interventions. The two experimental groups will be i.e., MentalImagery (experimental Group A) and Self-Regulation (Experimental Group B). The active control group (C) did not participate in any planned practice. The training will be conducted for a period of (twelve week), three days a week.

Data will be collected before and after the participants are exposed to the interventions. The data will be collected from all the thirty participants on the psycho-physiological and performance variables.

Statistical Techniques

For the analysis of the data's, ANCOVA will be applied at 0.05 level of significance.

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